

### REMARKS

Claims 1-11 are pending in the application. These claims were rejected as follows:

Claims / Section	35 U.S.C. Sec.	References / Notes
1-5, 7-8 & 10-11	§102(b) Anticipation	• Brennan, et al. (U.S. Patent No. 6,236,731)
6 & 9	§103(a) Obviousness	• Brennan, et al. (U.S. Patent No. 6,236,731)

5 Applicants have amended and added claims in the application such that independent claims 1 (directed to a method) and 7 (directed to an appertaining apparatus) each comprise the limitations of former claim 2, of former claim 3 and the combination of former claims 2 and 3—dependent claims have accordingly been amended and added. Applicants have further cancelled claims 2 and 3  
10 since the limitations of these claims have been incorporated into other claims, and claim 8 has been cancelled (which corresponded to the limitations of claims 2 and 3 combined) in favor of the new claims.

Applicants further provide discussion below for distinguishing the present invention from the art cited by the Examiner.

15 Applicants' use of reference characters below is for illustrative purposes only and is not intended to be limiting in nature unless explicitly indicated.

#### **35 U.S.C. §102(b), CLAIMS 1-5, 7-8 & 10-11 ANTICIPATION BY BRENNAN**

1. *Brennan fails to teach the determination of a speech signal level and a noise signal level in a plurality of frequency bands as well as the dynamic  
20 determination of automatic adjustment parameters.*

The invention concerns a method and appartaining apparatus for automatic amplification adjustment in hearing devices, with the following steps:

- transduction of the acoustic input signal into an electrical signal,
- determination of a speech signal level and an interference/ noise  
5 signal level in a plurality of frequency bands of the electrical signal,
- determination of parameters for automatic adjustment of the amplification of the electrical signal dependent on the speech signal level, the interference signal level and the frequency of the electrical signal.

10 Brennan discloses a hearing device with an analysis filter bank in which the number of the frequency bands as well as their limit frequencies can be adjusted with great flexibility.

In the OA, the Examiner stated:

15 Regarding claims 1, 5 and 7-8, Brennan et al. teaches an apparatus and a method for automatic amplification adjustment in a hearing aid device that comprises transducing (10) an acoustic input signal into an electrical signal, determining a speech signal level and a noise signal level in a plurality of  
20 frequency bands (col. 12, lines 26-64 and see figure 1), and determining parameters for automatic adjustment of an amplification of the electrical signal depending on the speech level, the noise signal level and frequency of the electrical signal dynamically (18, 28, 32, col. 10, lines 13-28) as claimed (figure 1).  
25

Regarding claims 2-4, Brennan et al. teaches the determining parameters step that comprises applying a loudness model (the noise signal level), a speech  
30 comprehensibility model, and further includes considering the total signal level when performing the automatic adjustment of the amplification (col. 12, lines 26-64 and see the text for figure 1).

Applicants respectfully disagree with the Examiner's assertion that Brennan teaches the determination of a noise signal level in a plurality of frequency bands. In the section of Brennan cited by the Examiner, the only portion addressing the noise issue is found at 12/57-64, which states:

5           For noise reductions systems, however, it is desirable  
to have a large number of bands so that only those  
portions of the spectrum that are noise can be  
attenuated, while not affecting parts of the spectrum  
without noise. To extract speech from noise, the filters  
10       should have small bandwidths to avoid removing  
speech harmonies. For the 8 kHz bandwidth  
mentioned, 128 bands provide bandwidths of 62.5 Hz  
which is adequate to avoid this problem.

There is no teaching or suggestion of determining the noise signal level in  
15 a plurality of frequency bands. Instead, Brennan presumes that certain portions  
of the spectrum are noise and suggests the desirability of having a large number  
of bands so that only those containing noise can be attenuated. Brennan further  
suggests the desirability of utilizing filters with small bandwidths to avoid  
removing speech harmonies. However, Brennan does not teach the  
20 determination of the noise signal level that is later used for the dynamic  
determination of parameters for automatic adjustment of an amplification.

The background noise may have different properties depending on a  
particular situation, and the present invention, by having the ability to determine  
the noise signal level in a plurality of frequency bands and utilize this information  
25 in determining the adjustment parameters can result in a better output signal for  
the user. As stated in paragraph [0010] of the Specification,

In the automatic adjustment of the amplification, the  
individual audiometric data of the hearing device user  
(for example the auditory threshold or the discomfort

threshold) may also advantageously be taken into account in the adjustment of the amplification. Thus not only the data of the hearing loss, but rather at the same time properties of the background noise go into the adjustment of the amplification. The effects of the hearing loss on the speech perception may thereby be taken into account. Since the calculation of adjustment parameters is implemented "online" with regard to the amplification, meaning during the normal operation of the hearing aid device under actual present speech and noise signals, effects of the hearing device signal amplification on the speech comprehensibility can be considered. For example, the speech comprehensibility is influenced by the effective compression.

Clearly this reflects an advantageous method and apparatus beyond that disclosed by Brennan.

Furthermore, the independent claims have been amended so that all claims in the application comprise a limitation that determining parameters comprises applying a loudness model and/or applying a speech comprehensibility model. By failing to take into account the noise level in a plurality of frequency bands, Brennan fails to disclose the utilization of the loudness model or the speech comprehensibility model as claimed in the current invention.

*2. Regarding the limitations of claim 4, Brennan fails to teach the use of both levels in a plurality of frequency bands and an overall level when determining the adjustment parameters.*

While Brennan does discuss the use of a multiband compressor system at 12/44-56, it fails to teach the use of any of the multiband parameters/values in conjunction with the use of a total or overall parameter/value, and therefore fails to teach or suggest the limitations of claim 4.

For these reasons, the Applicant asserts that the amended claim language clearly distinguishes over the prior art, and respectfully request that the Examiner withdraw the §102(b) rejection from the present application.

**35 U.S.C. §103(a00), CLAIMS 6 AND 9 OBVIOUSNESS IN VIEW OF BRENNAN**

- 5           3. *The use of individual audiometric data of a hearing aid user is not obviated by Brennan when combined with the use of a noise signal level in a plurality of frequency bands, as claimed by claims 6 and 9.*

In the OA, on p. 3, the Examiner stated:

10           Regarding claims 6 and 9, Brennan does not specifically teach that the determining of the parameters includes utilizing individual audiometric data of a hearing aid user. However, Brennan does not restrict to any audio signals or any type of audiometric data in hearing aids.

15           Therefore, it would have been obvious to one skilled in the art to provide any type of audiometric data for the Brennan system such as an individual audiometric of a hearing aid user for greater application.


The Applicants' agree with the Examiner that Brennan fails to teach  
20   determining the parameters utilizing individual audiometric data of the hearing aid user, but respectfully disagree that it would have been obvious to one skilled in the art to provide individual audiometric data of a hearing aid user for greater application. By utilizing a determination of the noise signal level in a plurality of frequency bands for the parameter calculations, it is possible to utilize aspects of  
25   individualized audiometric data that can relate to the multiband noise parameter determinations and be utilized more effectively than that according to the prior art.

For these reasons, the Applicant asserts that the amended claim language clearly distinguishes over the prior art, and respectfully request that the Examiner withdraw the §103(a) rejection from the present application.

### CONCLUSION

Inasmuch as each of the objections have been overcome by the amendments, and all of the Examiner's suggestions and requirements have been satisfied, it is respectfully requested that the present application be reconsidered, the rejections be withdrawn and that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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